



CONVENIENT QUANTIFICATION OF PFAS AND OTHER POLLUTANTS

FAST, SIMPLE, AND ACCURATE QUANTIFICATION OF DIOXINS, PFAS, EDCs AND OTHER EMERGING POLLUTANTS USING CALUX[®] PANELS AND THE CENTRO XS MICROPLATE LUMINOMETER

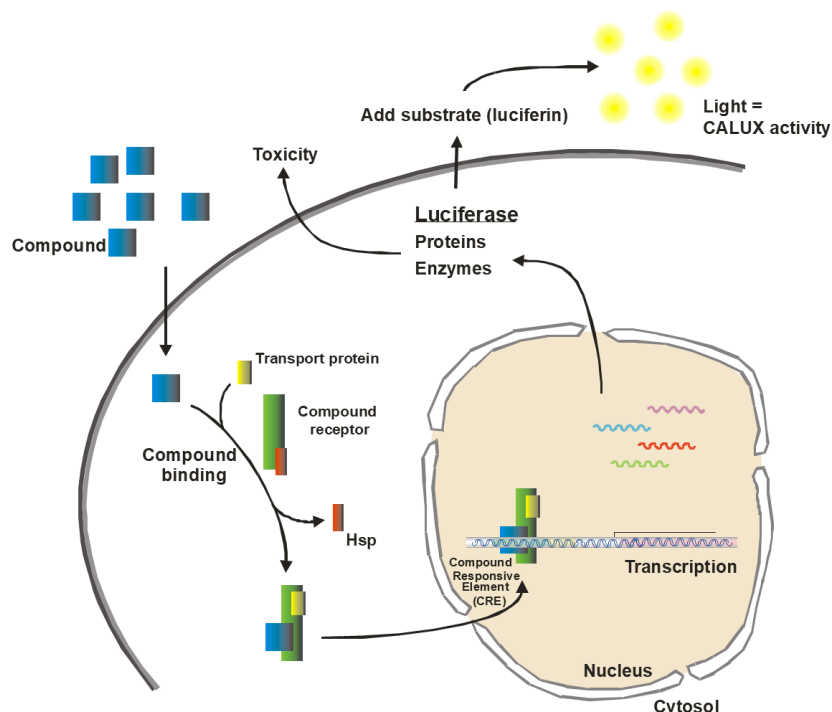
CALUX® bioassays

The CALUX® (Chemical Activated Luciferase gene eXpression) Assays from BioDetection Systems can be used to detect certain chemicals like PFAS, dioxins, dioxin-like PCB's or (anti)estrogens, (anti)androgen, (anti)progesterons, (anti)thyroids or PAH-like compounds.

The innovative CALUX® cells have been tailored so that they produce light in a concentration-responsive way when exposed to the chemicals.

The switch that turns the light on is specific to compounds or groups of compounds that have the same mode of action giving the specific CALUX® assay a selectivity and biological relevance that cannot be matched by instrumental techniques.

The compounds binding to a nuclear-receptor followed by transportation of the receptor complex into the nucleus of the cell and subsequent binding to specific sequences in the DNA. These specific DNA sequences are called



responsive elements (REs). Binding of the chemical-receptor complex to the RE triggers the expression of RE associated genes. The toxicological impact of the chemicals starts with the observed change in gene expression.

BENEFITS OF BDS' TECHNOLOGY FOR SAFETY AND BIO-ACTIVITY ASSESSMENT

- ✓ High throughput panel covering major health effects
- ✓ Sensitive and specific
- ✓ Easy sample clean-up / work-up
- ✓ Applicable to a wide variety of matrices and applications
- ✓ Accepted in international legislation and guidelines, e.g. EU, OECD, ISO
- ✓ Offered under ISO 17025/GMP+ certified conditions
- ✓ Complementary assays and analysis to match your application
- ✓ Short turn-around time
- ✓ Cost-effective
- ✓ Professional services, backup and consultancy
- ✓ Global sales and support network

PFAS (short- and long-chain)

From 1 Jan 2026, the European Union set maximum limit values for PFAS-20 in drinking water. PFAS are one of the most toxic man-made compounds known and can be measured with the PFAS (long-chain) and PPAR α (short-chain) CALUX[®]. The PFAS CALUX[®] technology is being used as a rapid, sensitive and cost-effective tool for screening all kinds for water (e.g., drinking-, ground-, surface-, waste- and/or marine) for PFAS and PFAS-like compounds (covering up to minimal 200 toxic and max. 7500 PFAS; Sosnowska et al. 2025). Traditional instrumental techniques such as GCMS and HRGCMS can only analyse max. 100 PFAS in one sample at a time, making them comparably slow and expensive and not suitable for screening large numbers of samples with large numbers of PFAS-like compounds rapidly, safe and sustainable.

Dioxins

From 1 July 2002, the European Union set maximum limit values for dioxins in food and feed. Dioxins are one of the most toxic man-made compounds known and can be measured with the DR CALUX[®]. Also, DR CALUX technology is described and used for water testing according to ISO/DIS 24295 guidelines.

Biocides & PPPs (pesticides) and their Endocrine Disrupting Activities

From 7 June 2018, a new guidance document from EFSA and ECHA for the identification of endocrine disruptors in the context of Regulations (EU) No 528/2012 and (EC) No 1107/2009 a panel of CALUX[®] bioassays are recommended to use such as:

- for estrogens the ER CALUX[®] (according to OECD TG455/ISO 19040-3);
- for (anti-) androgens the AR CALUX[®] (TG458-like testing);

- for thyroid-like testing by TR and TTR-TR CALUX[®] bioassays and
- for Steroidogenesis (testing by H295R cell with ER and AR CALUX[®] readout).

Plastic additives and their Endocrine Disrupting Activities

New guidance documents from the EU parliament and ILSI for the identification of endocrine disrupting chemicals in the context of food contact materials a panel of CALUX[®] bioassays are recommended to use, such as:

- for estrogens the ER CALUX[®] (according to OECD TG455/ISO 19040-3);
- for (anti-) androgens the AR CALUX[®] (TG458-like testing);
- for thyroid-like testing by TR and TTR-TR CALUX[®] bioassays and
- for Steroidogenesis (testing by H295R cell with ER and AR CALUX[®] readout)

Mixture Toxicity and Non-animal alternative testing

Several international guidance documents (ToxCast, US EPA, ChemScreen, EU project, Solutions EU project) for the identification of mixture toxicity (e.g. in water) with a panel of CALUX[®] bioassays are recommended to use, such as:

- for estrogens the ER CALUX[®] (according to OECD TG455/ISO 19040-3);
- for (anti-) androgens the AR CALUX[®] (TG458-like testing);
- for thyroid-like testing by TR and TTR-TR CALUX[®] bioassays and
- for Steroidogenesis testing by H295R cell with ER and AR CALUX[®] readout.

Method

The technique is undertaken on 96- and/or 384 well plates, which makes it possible for large numbers of samples to be analysed simultaneously.

After sample collection (1), a simple extraction method is used to extract the chemical content (2). The extract is cleaned up and fractionated if desired (3), after which the clean extract is dissolved in DMSO.

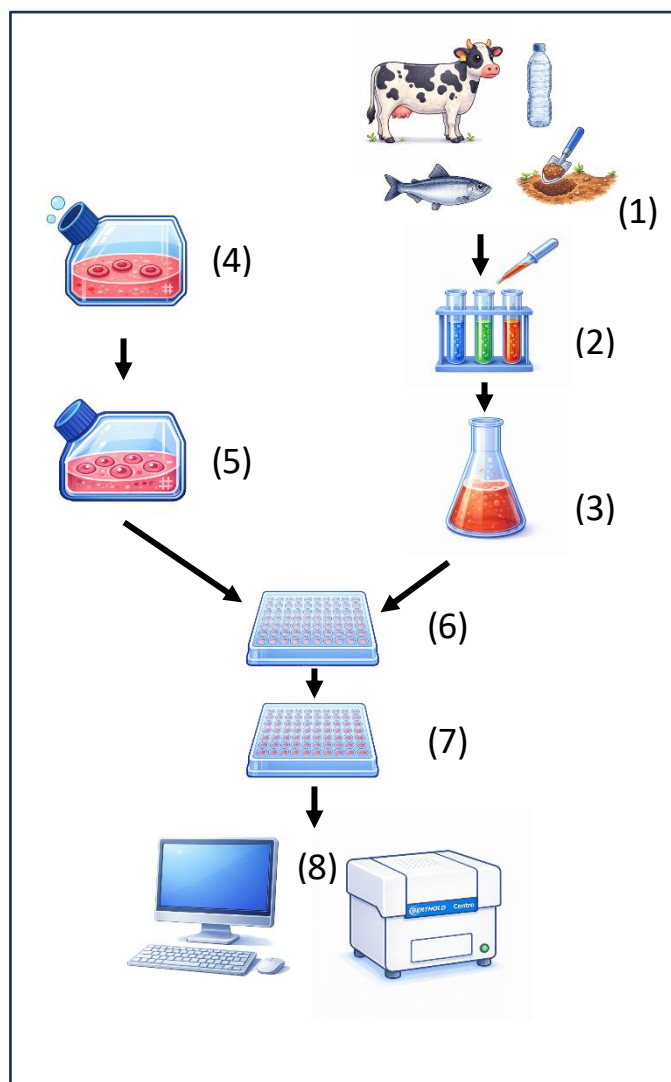
Meanwhile, BDS' CALUX® cells are cultured (4, 5) and finally grown in 96-well plates under standardized conditions (6).

Once a confluent monolayer is obtained, the cells are exposed to the diluted cleaned extracts (7).

After lysis and addition of luciferin, the luciferase activity is quantified using the Centro XS microplate luminometer (8).

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